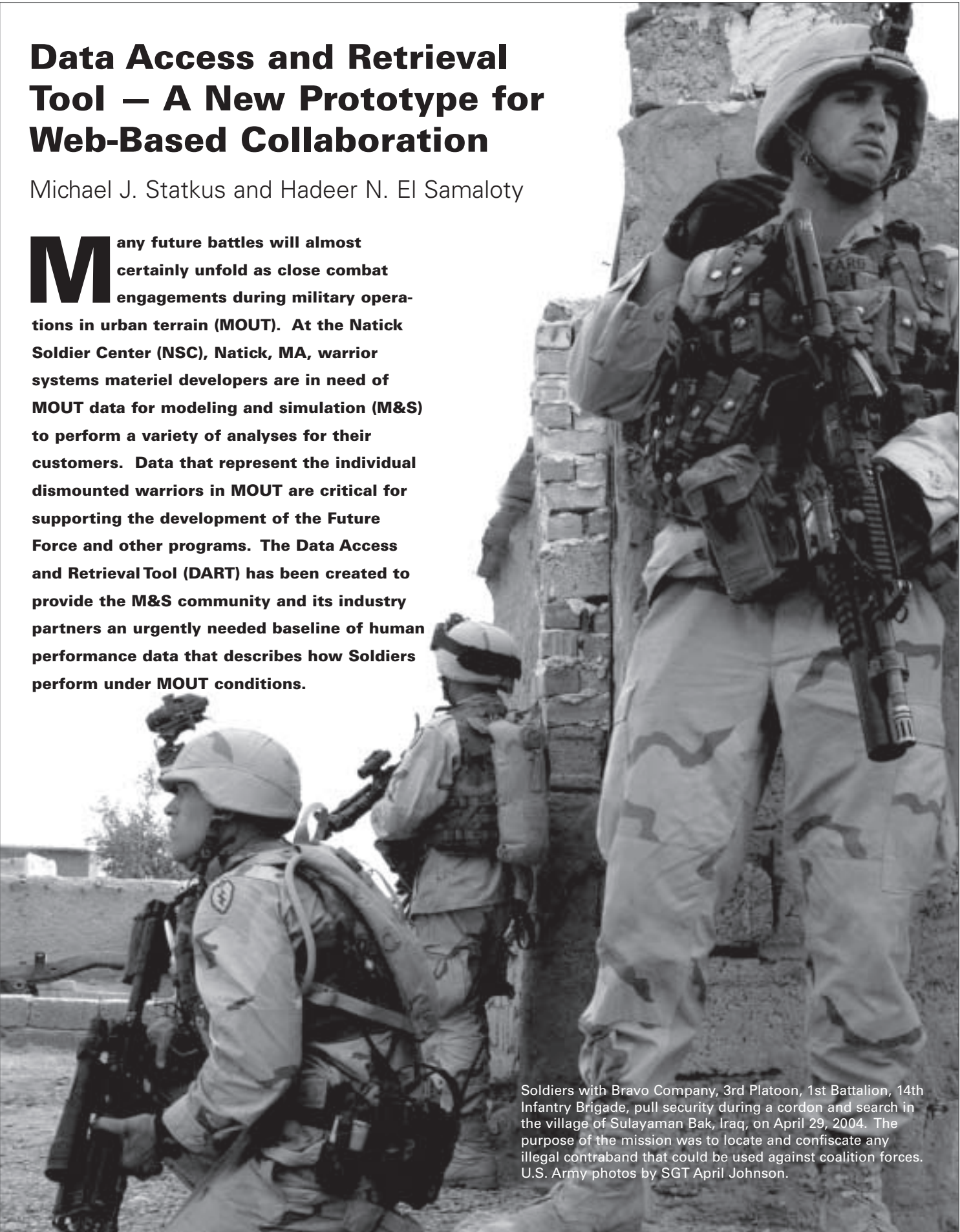# Data Access and Retrieval Tool — A New Prototype for Web-Based Collaboration

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Many future battles will almost certainly unfold as close combat engagements during military operations in urban terrain (MOUT). At the Natick Soldier Center (NSC), Natick, MA, warrior systems materiel developers are in need of MOUT data for modeling and simulation (M&S) to perform a variety of analyses for their customers. Data that represent the individual dismounted warriors in MOUT are critical for supporting the development of the Future Force and other programs. The Data Access and Retrieval Tool (DART) has been created to provide the M&S community and its industry partners an urgently needed baseline of human performance data that describes how Soldiers perform under MOUT conditions.

Soldiers with Bravo Company, 3rd Platoon, 1st Battalion, 14th Infantry Brigade, pull security during a cordon and search in the village of Sulayaman Bak, Iraq, on April 29, 2004. The purpose of the mission was to locate and confiscate any illegal contraband that could be used against coalition forces. U.S. Army photos by SGT April Johnson.

Background

The NSC Human Science/Modeling and Analysis Data (HSMAD) Project, initiated in FY01, is funded through FY04 to address several Soldier performance data gaps. During this 4-year research effort, dismounted warrior performance data have been obtained from field exercises, simulator tests, data mining and subject matter expert interviews. This MOUT data collection effort is focusing on the following primary infantry tasks:

• Move, shoot and communicate.
• Sense/perceive and decide situation awareness and human behavior representation.
• Supporting data, (physiological data and equipment performance characteristics).

DART was envisioned as a means of making the collected data accessible to the entire M&S community. Making strides toward achieving this HSMAD Project capstone goal, DART was initially developed and deployed June 27, 2003. Historically, agencies that generate and collect data are often protective or unwilling to share their data for fear of losing control over its use. It is hoped that DART will set the pace as the prototype for fostering a renewed era of information and knowledge exchange.

DART's backbone is its data warehouse, which uses Microsoft® SQL Server 2000 Enterprise Edition. The data warehouse uses a snowflake schema to better accommodate large amounts of data and to provide the ability to expand as more data becomes available from both internal and external sources. A Web-based Graphical User Interface (GUI) application allows universal and user-friendly access to the data warehouse and all of its contents.

The DART data warehouse possesses these basic features and capabilities:

• Accessible through the Internet.
• Intuitive and easy-to-use GUI.
• Password-protected user accounts on a secure server.
• Data categorized by primary infantry tasks.
• Expandable as more data becomes available.
• Flexible as different kinds of data become available.
• Data extract, transform and load (ETL) tools.
• Commercial-off-the-shelf software architecture.

From the first login, users will immediately find DART easy to use. For efficient retrieval of information, data can be presented and categorized in the predefined data classes of *Move, Shoot, Communicate and Sense/Perceive* and *Decide*. The database stores both summary and raw data (if available) organized according to these data classes. Raw data is presented and maintained in its original form, such as Microsoft Excel spreadsheets, and is exportable to third-party applications for analysis. In addition to the five data classes, a Side Navigation Bar, multiple common links and innovative search tools aid the user in surfing the DART site for specific data and supplementary information.

DART houses and displays documents in a variety of formats. A multimedia toolbar with icon links to the various formatted files held in DART provides users with one

> A soldier with Bravo Company, 3rd Platoon, 1st Battalion, 14th Infantry Brigade, pulls security during a cordon and search in Iraq.

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1st Battalion, 14th Infantry Brigade Soldiers roll down a street in Iraq during cordon and search operations.

of several options for viewing study-related information. Viewers can access text documents in Microsoft Word and Adobe® Acrobat® PDF formats, spreadsheets in Excel format, presentations in Microsoft PowerPoint format and videos and pictures in standard formats. Files can generally be viewed by simply clicking on a link. However, should a user need to download a viewer for any application, links are provided directly from the DART Web site.

DART also possesses an online help system to assist users in navigating any application. It provides information and examples that illustrate how the multiple search and query filters can be leveraged optimally. A Feedback Page also offers users the opportunity to communicate via e-mail with DART administrators to address comments, questions or suggested improvements to the Web site. DART also offers a variety of search tools to aid users in locating studies, summarized data, related files and analytic resources. Users will primarily search for studies via the "Study Search" tool, which provides several parameters for locating desired studies. Parameters to search or sort by include the study's identification number, study name, principal investigator, date, data class and keywords. Study Search results are hyperlinked to their respective study home pages, making it easy for users to quickly jump to the information. Once they arrive at a study home page, users can read the study's abstract, see a list of related files or hyperlink to summary data.

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DART's "Query" feature has the capability to drill down into data vertically and horizontally across all studies and tests cataloged in DART. In creating queries, data can be filtered by data classes such as mission, enemy, terrain, troops, time available and civilian parameters and statistical measures of interest. For added user-friendliness, each row returned as a query result is hyperlinked to its relevant study and allows the user to access the study's information with one click. The Query tool also gives users the capability to save their queries and return to them at a later date.

The "File Finder" — which functions much like the "Study Search" mechanism — is an extremely useful tool that allows users to quickly locate documents in DART. It provides options to search DART by file type, file identification number, file name, keyword, country of origin or data class. When users execute searches, DART returns file results split into "Study Related Files" and "Analytic Resources" files.

Bravo Company, 3rd Platoon, 1st Battalion, 14th Infantry Brigade, provides security as a Humvee rolls by during a mission in Iraq to locate and confiscate illegal contraband that could be used against coalition forces.

Under the Study Search and Query functions, DART users can easily access dismounted warrior performance data. However, researchers may need other supplemental data to successfully execute analyses or populate their models. Accordingly, there is a wealth of information contained under "Analytic Resources." Here, users can find equipment specifications, weapons performance data, physiological data, Web site links, videos, still photos and a host of information geared toward research methodologies.

The "Submit Information" function will be critical to DART's continued growth and usefulness to the M&S community. It allows users to send their data to DART administrators for potential uploading into the system. Although DART's primary focus is on dismounted warrior performance data in MOUT, any information that can provide a better understanding of how Soldiers fight in these complex environments will be considered for inclusion.

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New Prototype

DART's design allows for the storage, retrieval, maintenance and manipulation of dismounted warrior performance data in a simple, widely accessible and usable form. It is hoped that DART will help to increase the validity of M&S analyses by making available empirical data collected in the field. Also, DART will foster dialogue between DOD agencies, DOD contractors and international allies. Currently, more than half of DART users are affiliated with the U.S. Army or other government organizations while the remaining user base is comprised of contractors, academicians and international partners. Clearly, DART provides analysts with an atmosphere for collaboration and gives leaders the critical information they need to make informed decisions. In the end, our Soldiers will benefit from superior technology that gives them a decisive edge in MOUT and combat operations.

To request a user account, please log on to **https://www.natick-dart.com/**.

The submission of studies and other relevant information is welcome and encouraged.

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